

Researchers discover immune system changes that support peanut allergy remission in children

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Researchers have discovered the key immunological changes that support the remission of peanut allergy in children, paving the way for new, more targeted treatments. Credit: Daniella Segura

Australian researchers have discovered the key immunological changes that support the remission of peanut allergy in children, paving the way

for new, more targeted treatments.

The research showed for the first time that specific gene networks are rewired to drive the transition from peanut allergy to clinical remission following a combination treatment of a probiotic and peanut oral immunotherapy.

Led by the Murdoch Children's Research Institute (MCRI) and the Telethon Kids Institute, and published in *Allergy*, the study found that this network reprogramming essentially shuts down the allergic immune response that was responsible for causing a food allergy.

Lead researcher, Murdoch Children's Professor Mimi Tang, said this was the first study to map the complex gene to gene communication and connectivity underlying clinical remission of peanut allergy.

"The immunological changes leading to remission of peanut allergy were largely unknown," she said. Previous studies had mostly focused on examining the levels of gene expression, without also exploring how genes interact with each other. But genes don't work in isolation; instead, biological responses are controlled by large numbers of genes communicating with each other, so it made sense to look at these interactions more closely.

"What we found was profound differences in network connectivity patterns between children who were allergic and those who were in remission. These same changes were also seen when we compared gene networks before and after immunotherapy in the children who achieved remission following immunotherapy."

The randomized [controlled trial](#) involved 62 peanut allergic children from Melbourne, aged 1-10 years, who received a combination treatment of a probiotic and oral immunotherapy (the gradual introduction of the

allergenic food) or a placebo. Following 18 months of treatment, 74 per cent taking the combination treatment achieved remission compared with 4 per cent in the placebo group.

The peanut oral immunotherapy that was used in combination with the probiotic in the trial was PRT120, a lead candidate from Prota Therapeutics, an Australian biotech company focused on bringing its novel allergy immunotherapy treatment for children with life-threatening peanut allergies to market.

The team led by Professor Tang also recently showed in a separate trial that two treatments—the combination probiotic and peanut oral immunotherapy treatment and the peanut oral immunotherapy alone—were highly effective at inducing remission and desensitization. About half of the treated children achieved remission, which allowed them to stop treatment and safely eat peanut freely.

Murdoch Children's Dr. Sarah Ashley said while oral immunotherapy could successfully induce desensitization and remission, desensitization often waned after treatment ended or even during ongoing maintenance dosing.

"Certain changes in the allergen-specific immune cells, called Th2 cells, are critical to achieving lasting remission," she said. "Th2 cells are essential for generating allergen-specific antibodies and the development of [food allergy](#). We found that the Th2 signaling that drives allergy is 'turned off' in children in remission."

Food allergy is a global public health concern, affecting 10 per cent of infants and 5-8 per cent of children.

Telethon Kids Institute's Dr. Anya Jones said because there was no cure for food allergies, management relied on avoidance of the allergenic

food, resulting in reduced quality of life.

"Understanding the complex immune processes that support remission will provide greater insight into key drivers of treatment success and potentially identify novel targets for more effective treatments that deliver long-term solutions for patients," she said.

Ju Lee Ng's daughter Stella, 9, was diagnosed with a peanut allergy at 18 months of age after breaking out in hives from a meal containing traces of the nut.

But Ju Lee said after taking part in a Murdoch Children's allergy trial, Stella had been in clinical remission for almost four years and now eats peanut regularly.

"Stella's quality of life has improved considerably since the trial," she said. Her level of anxiety has reduced dramatically and she has the freedom to enjoy different types of food. Stella no longer has to always check food labels for peanuts and brief her teachers or friends' parents about her [allergy](#). She can now dig in and enjoy a bag of peanut M&Ms.

"We previously had to avoid travel to countries that use lots of peanuts in the food, including Malaysia, where my husband and I are from. Shortly after Stella achieved [remission](#) we were so excited to be able to travel on a family holiday to Thailand. We tried local dishes and enjoyed an amazing holiday without the stress that Stella could have an allergic reaction."

Ju Lee said it was reassuring to learn that new treatments could be developed off the back of the latest study results by the Murdoch Children's.

"This research will give a lot of hope to families who have children with

a [peanut allergy](#)," she said. "We hope other families can experience the same sense of comfort we now have with a child who can eat peanut freely without fear of a reaction."

More information: Mimi Tang et al, Remission of peanut allergy is associated with rewiring of allergen-driven T helper 2-related gene networks, *Allergy* (2022). [DOI: 10.1111/all.15324](https://doi.org/10.1111/all.15324)

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